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Agricultural Water

10.1 Introduction

This section describes the agricultural industry in the basin. It also discusses the problems, needs and future of agriculture.

The success of the agricultural industry is dependent on the climate and the water supply. Refer to Section 3.3.2 for a more complete discussion of the area climate. Section 5.4 gives information on the total water supply available.

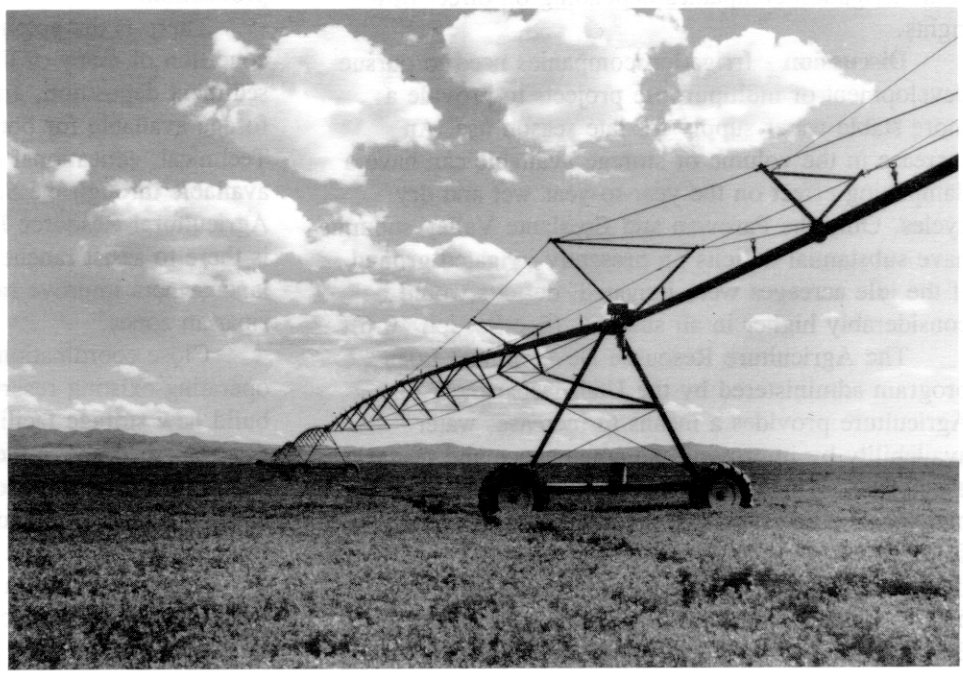
With agriculture being a major industry in the basin, it has a direct impact on the economy of the area. Spinoff from agriculture helps support employment and production in other sectors along with providing economic diversity.

10.2 Background

There are about 130,450 acres included in the water-related land use inventory of the Cedar/Beaver Basin.[17] This includes 6,010 acres of wet areas and open water and over 13,630 acres of residential and industrial areas. Irrigated cropland amounts to about 110,810 acres or only 3.1 percent of the total basin area of 3.62 million acres.

Much of the basin contains arable soils but they cannot be cropped because of lack of irrigation water or insufficient precipitation. Other areas are restricted because of the topography, i.e., rolling hills, cliffs and mountains. Nearly all of the area is suitable for grazing, although it is not all utilized. Typically, the irrigated cropland is in the valley bottoms where the land is relatively flat. Much of the non-irrigated, dry cropland areas are located in the higher mountain valleys and benches where there is arable land and sufficient precipitation.

■ Agriculture is the largest industry in the basin, growing mostly crops to support livestock production and for export. Late season water shortages are a problem.



Near Enterprise

Rangeland is found from the low lying desert areas to the high mountain forest lands.

The number of farms has decreased by about one-third over the years.[69] This has been accompanied by an increase in the average farm size. This reflects the need for more acreage to maintain a viable farm unit. An increase in the number of hobby farms may offset this trend. Also, as more farmers seek outside employment and they in effect, become part time farmers, the average farm size may decline. The average farm in the basin contains about 1,050 acres. The average farm size has about doubled since 1950. There may be a continual adjustment as existing irrigated cropland is converted to other uses and additional land is brought into agricultural production. Water for agriculture is limited. Over the long-term, the acreage will probably decline slightly, reversing past increases.

Cattle production is currently the major farm-related industry. This industry consists primarily of cow-calf operations with some beef feeding and dairies. Most of the crops grown are used to support these activities along with the pasture and rangelands.

10.3 Policy Issues and Recommendations

There are two policy issues involving agriculture. These are late season irrigation water shortages and watershed areas with critical erosion.

10.3.1 Agricultural Water Supply Shortages

Issue - Late season water supply shortages effect some irrigation companies depending on direct flow rights.

Discussion - Irrigation companies need to pursue development of multipurpose projects to provide a more stable water supply for late season use. An increase in the volume of storage available can have a dampening effect on the year-to-year wet and dry cycles. Only the Parowan and Escalante Valley subunits have substantial deficits on presently irrigated ground. If the idle acreages were irrigated, deficits would be considerably higher in all subunits (See Section 10.6).

The Agriculture Resource Development Loan program administered by the Utah Department of Agriculture provides a means to increase water availability by improving the conveyance and on-farm efficiencies. This can be accomplished by the timely maintenance and repair of diversion and delivery facilities. In some areas, new structures and canal lining or pipelines are needed. However, structural measures can be ineffective without good management. On-farm best management practices can be a boon to efficient water conservation goals as well as increasing profits for farmers.

One adverse effect of increasing water use efficiency in some areas is the reduction in deep percolation. This reduces the recharge to the groundwater reservoir. To offset this, however, there is a reduction in the leaching of salts into the groundwater and the maintenance of a higher quality of water.

Recommendation - Irrigation companies, with the assistance of the appropriate local, state and federal agencies, should move to protect and improve their water supplies by implementing water conservation programs and multipurpose projects where possible.

10.3.2 Watershed Management

Issue - Many areas of severe and critical erosion exist in watersheds of the basin.

Discussion - Excessive sediment yield from both natural source areas and man's activities result in lower value wildlife habitat, degraded fishery values, less rangeland forage for grazing and poorer surface water quality. This indicates some lands are out of ecological balance in many of the sensitive areas around the basin.

Considerable work has been accomplished to improve the rangeland conditions in some areas. Rangeland improvement was part of the Minersville and Greens Lake Watershed projects. Other smaller tracts of rangeland have been improved at locations around the basin. These all generally consist of chaining brush and pinyon-juniper stands and reseeding with grasses to reduce erosion and increase feed production.

There is the potential to improve the watershed condition of many of these lands, reduce erosion and sediment deposition, and at the same time increase the forage available for both livestock and wildlife. Technical, educational and financial assistance are available through the Soil Conservation Commission's Agricultural Resource Development Loan program. It is there to assist ranchers and farmers and other private land owners improve rangeland, cropland, wetlands and riparian zones.

Close coordination among agencies and entities operating existing reservoirs or proposing to enlarge or build new storage facilities is needed. Improvement of the watershed above these structures could be carried out to maximize the use of available resources. In other areas, rehabilitation and management of the watershed can reduce erosion and increase forage production.

Recommendation - The Soil Conservation Commission and its local soil conservation districts,

working closely with the Natural Resources Conservation Service, Forest Service, Bureau of Land Management and private land owners, should evaluate all lands of the watersheds for potential improvement projects and implement those which are feasible.

10.4 Agricultural Lands

Lands used for agriculture cover a major portion of the Cedar/Beaver Basin. These lands are in all kinds of ownership and administration categories: private, state and federal. Most of the acreages used for grazing are under federal administration.

10.4.1 Irrigated Cropland

Lands used for farming can be defined according to their agricultural production ability and potential. There are two major categories defining the best farmlands: prime farmlands and farmlands of statewide importance. The national definitions for farmlands of statewide importance have been modified for application to the state of Utah. Land designated as prime may not be the most productive. It will, however, have the best combination of physical and chemical characteristics for producing food, feed, forage and other crops. To insure long-term production, these lands must be managed according to their inherent capabilities. There are about 38,000 acres of prime farmlands and 16,000 acres of farmlands of statewide importance.

Prime farmlands have a dependable water supply (eight or more years out of 10 years), favorable climate, little flooding or erosion, good quality soils and no water table problems. Farmlands of statewide importance have a dependable water supply (five to eight years out of 10 years), good climate, some flooding or erosion, good quality soils and a water table that does not prevent crop production. Farmlands of statewide importance do not qualify as prime farmland because the water supply is less dependable, lands are steeper with more erosion and they require more management.

The Division of Water Resources completed a water-related land use survey of Cedar/Beaver Basin cropland areas in 1989 and determined there are 110,810 acres of irrigated cropland. The major crops grown include alfalfa, 61 percent; pasture, 11 percent; small grains, 8 percent; potatoes, 3 percent and corn silage, 2 percent. There is a substantial portion (13 percent) of the cropland in any given year that is either idle or fallow. The irrigated land by crop is shown in Table 10-1.

Most of the crop production is used to support the livestock industry although alfalfa is shipped out of the area, primarily to Nevada and California. Most of the

Early May's morning sun harvests frost and icicles from alfalfa and fences near Beaver.

exported alfalfa is from the Milford and Beryl-Enterprise areas.

There has been an increase in the area of irrigated land over the years. In 1949, the total irrigated area was 58,490 acres. This had increased to 85,910 acres by 1965 and 110,810 acres by 1989. Some of this can be attributed to increased on-farm irrigation efficiencies through land leveling, canal and ditch lining, and pipelines with gravity sprinklers. Better irrigation water management has also helped increase the irrigated acres. Increased use of groundwater is the supply for the majority of the irrigation of additional acres of cropland. Installation of sprinklers in pump areas has increased the irrigation efficiency, which in turn accounted for some increase in the total acres irrigated. These trends are shown in Table 10-2. Most of the changes reflect the available water supply. Also see Table 5-10 for more detail on the current irrigation water use.

10.4.2 Dry Cropland

There are about 38,460 acres of dry cropland (non-irrigated) in the basin. Nearly 60 percent of this is located in Parowan Valley and Cedar Valley. About two-thirds of the total dry cropland is either idle, fallow or not cropped for other reasons on any given year. Most of the dry cropland produces grasses that are grazed by livestock. These grasses are native and exotic varieties. Very little dry cropland is used for small grain production.

10.4.3 Rangelands

Over 90 percent or 3.3 million acres of the Cedar/Beaver Basin area is used for grazing purposes. Some of this land is forested, but it is also grazed. Much of the grazed area is located in the lower elevations, making it suitable for winter grazing.

Permitted grazing on public lands declined after the 1940s, but since then it has remained stable or

Table 10-1
IRRIGATED LAND BY CROPS[17]

Crop	Beaver	Iron	Millard	Washington	Total
			(Acres)		
Fruit	0	15	0	0	15
Small grain	2,361	6,229	11	221	8,822
Corn Silage	1,902	648	26	5	2,581
Vegetables	0	94	0	1	95
Potatoes	100	3,250	0	191	3,541
Onions	0	0	0	0	0
Beans	0	0	0	0	0
Other Row Crops	0	0	0	0	0
Alfalfa	22,800	43,207	29	1,149	67,185
Grass Hay	1,397	464	0	104	1,965
Grass/Turf	21	64	0	0	85
Pasture	6,305	4,790	82	384	1,561
Fallow	435	1,368	0	75	1,878
Idle Overgrown	3,379	8,603	232	457	12,671
Pasture (surf. & subs.)	266	0	0	0	266
Grass Hay (surf. & subs.)	0	0	0	0	0
Surface Subtotal	38,966	68,732	380	2,587	110,665
Subsurface Subtotal	141	7	0	0	148
Total	39,107	68,739	380	2,587	110,813

Table 10-2
IRRIGATED CROPLAND CHANGES (Acres)

Subarea/County	1949	1965	1989
Beaver[a]	8,980	13,100	18,040
Milford	13,230	19,450	21,450
Beaver County	22,210	32,550	39,490
Cedar	11,410	16,780	17,000
Parowan	5,460	8,030	19,060
Beryl	17,990	26,470	32,680
Iron County	34,860	51,280	68,740
Enterprise	1,420	2,080	2,580
Washington County	1,420	2,080	2,580
TOTAL	58,490	85,910	110,810

Source: Data for 1949 were taken from the Beaver River Basin Summary Report, USDA-DNR Cooperative Study which referenced the U.S. Census of Agriculture.

Data for 1965 were from an inventory made cooperatively by the Soil Conservation Service and the Division of Water Resources and summarized in Appendix II, Present and Projected Resource Use and Management, completed as part of the above cooperative study.

Data for 1989 were taken from Water-Related Land Use Inventory of the Cedar/Beaver Study Unit conducted by the Division of Water Resources.

[a] Includes 380 acres in Millard County.

increased slightly in some areas. There has been considerable work done in localized areas to increase livestock and wildlife forage on rangelands with practices such as pinyon-juniper and brush chaining and reseeding with grass. Management practices have been improved over the years. The rangeland condition shown in Table 10-3 indicates opportunity for improvement. Forage production varies greatly between types of vegetation, range condition, and good and bad years. Range in fair condition produces only 50 to 80 percent as much forage as range in good condition. Variations from good to bad years can reduce forage production 40 to 70 percent.

There are about 325,000 animal unit months (AUMs) of grazing produced in the basin. An AUM is the amount of forage needed to sustain one 1,000 pound cow and a calf for one month. Table 10-4 shows the number of AUMs produced by land status. The Bureau of Land Management has allocated about 11,000 AUMs for wildlife and 8,000 AUMs for wild horses in Beaver and Iron counties. The Forest Service estimates about 10 percent of the total AUMs on national forest lands is utilized by wildlife.

10.5 Watershed Management

Watershed management is the protection, conservation and use of all the natural resources of a specific watershed in such a way as to keep the soil mantle in place and productive. It is also to assure water yield and water quality meet the existing and potential uses. If not properly protected, watershed lands are readily damaged from erosion, floods, sediment and fire. Following are some of the treatment measures used to keep the watersheds a viable producer of resources.

- Livestock and wildlife grazing management.
- Vegetation improvement of the cropland, rangeland, pastures, forest land, pasture land, wetlands, riparian zones and other areas. Also,

Table 10-3
RANGELAND CONDITIONS

W.S. No.	Name	Total Area	Rangeland Area	Rangeland Condition		
				Excellent/ Good	Fair	Poor/Very Poor
		(Acres)	(Acres)		(Acres)	
1	Clear Lake	462,900	407,900	48,900	308,600	50,400
2	Black Rock	341,400	311,400	62,200	211,800	37,400
3	Cove Fort	49,800	48,800	4,900	29,300	14,600
4	Beaver	323,100	298,100	35,000	221,600	41,500
5	Twin M	357,600	327,100	33,700	205,100	88,300
6	Fremont Wash	249,800	230,800	21,200	186,500	23,100
7	Thermo	648,300	573,500	41,200	377,500	154,800
8	Escalante Valley	567,700	520,700	51,300	365,300	104,100
9	Coal Creek	309,600	294,600	29,500	183,600	81,500
10	Pinto	166,900	153,900	21,600	103.800	28,500
11	Shoal Creek	139,700	132,700	13,300	95,800	23,600
Total		3,616,800	3,299,500	362,800	2,288,900	647,800
	Percent of Rangeland		100	11	69	20

Note: Rangeland condition total acres do not agree with basin total as some areas are not used as rangeland or were not rated.

Table 10-4
AUM PRODUCTION

Land Status	Production (AUMs)
Private	98,000
State	16,000
Public Domain	185,000
National Forests	26,000
TOTAL	325,000

conservation tillage protection on cropland in the lower watershed coordinated with grazing management. Improved cropping sequences, pasture and hayland management and improved irrigation systems and management are important.

- Structural measures, such as contour trenching, debris basins, gully control, and stream channel stabilization, all in conjunction with vegetation improvement and grazing management.
- Spring areas protected from wildlife and livestock by fencing. Watering facilities provided outside the fenced area.

For the purposes of this plan, the basin has been

divided into 11 watershed units as shown in Figure 10-1. These watershed delineations were made during the interagency Conservation Needs Inventory. Table 10-3 gives the areas and describes their range condition. These are areas where the use, treatment and conservation of resources can be carried out as a unit.

Erosion is a problem in parts of the basin. This is particularly true in areas where sparse plant cover provides little protection to the soil. Intense thunderstorms frequently produce flash floods, eroding the landscape. Heavy rains soon after fires also causes increased erosion. In these areas, a majority of the erosion is geologic or background, but in some areas it has been accelerated by mans activities and wildlife mismanagement.

The degree of erosion can be measured by the amount of soil eroded in tons/acre/year or inches of soil lost. It can also be described by the sediment yield condition. This is the measured percent of total area that is yielding a given percent of the sediment. The higher the percent of yield and the smaller the yielding area; the greater the erosion problem. For purposes of this report, sediment yield class is used to describe areas with high erosion rates where there is a need for watershed improvement. These classes are described below.

Areas where erosion is critical can be divided into two categories; one where erosion is background or geologic and another where erosion has been accelerated by man's activities. Both of these categories are eroding at a rate greater than 0.010 inches per year and are included in Class 2. The areas of accelerated erosion for drainages where watershed treatment is needed are shown in Table 10-5.

CLASS 2 (high yield) - 12 percent of the total area is yielding 35 percent of the sediment;

CLASS 3 (moderate high yield) - 48 percent of the total area is yielding 51 percent of the sediment;

CLASS 4 (moderate yield) - 24 percent of the total area is yielding 12 percent of the sediment and;

CLASS 5 (low yield) - 16 percent of the total area is yielding 2 percent of the sediment.

Sediment yields from CLASS 2 (also called critical or accelerated erosion) areas are at least three times the modelled rates for land in good condition. This is due to man's activities, mostly overgrazing and some timber harvesting, along with wildlife management issues. This excessive sediment production is depleting the watershed values. It is reducing wildlife habitat, degrading fishery values, increasing sediment deposition and decreasing rangeland grazing values.

The accelerated erosion areas (Class 2, high yield) for each of the watersheds are shown on Figure 10-1. The erosion (sediment yield) data was derived from regional broadbase assessments. Detailed studies would be necessary to characterize the present and future sediment yield condition.

10.6 Agricultural Water Problems and Needs

The water budget analysis for the Cedar/Beaver Basin determined the water supply, use and outflow. The budget shows the consumptive use deficit on presently irrigated cropland, not including idle and fallow lands, is 4,930 acre-feet. The deficit by subarea is as follows: Upper Beaver, 0 acre-feet; Milford, 20 acre-feet; Lower Beaver, 0 acre-feet; Parowan, 1,790 acre-feet; Cedar, 270 acre-feet; and Escalante Valley, 2,850 acre-feet.

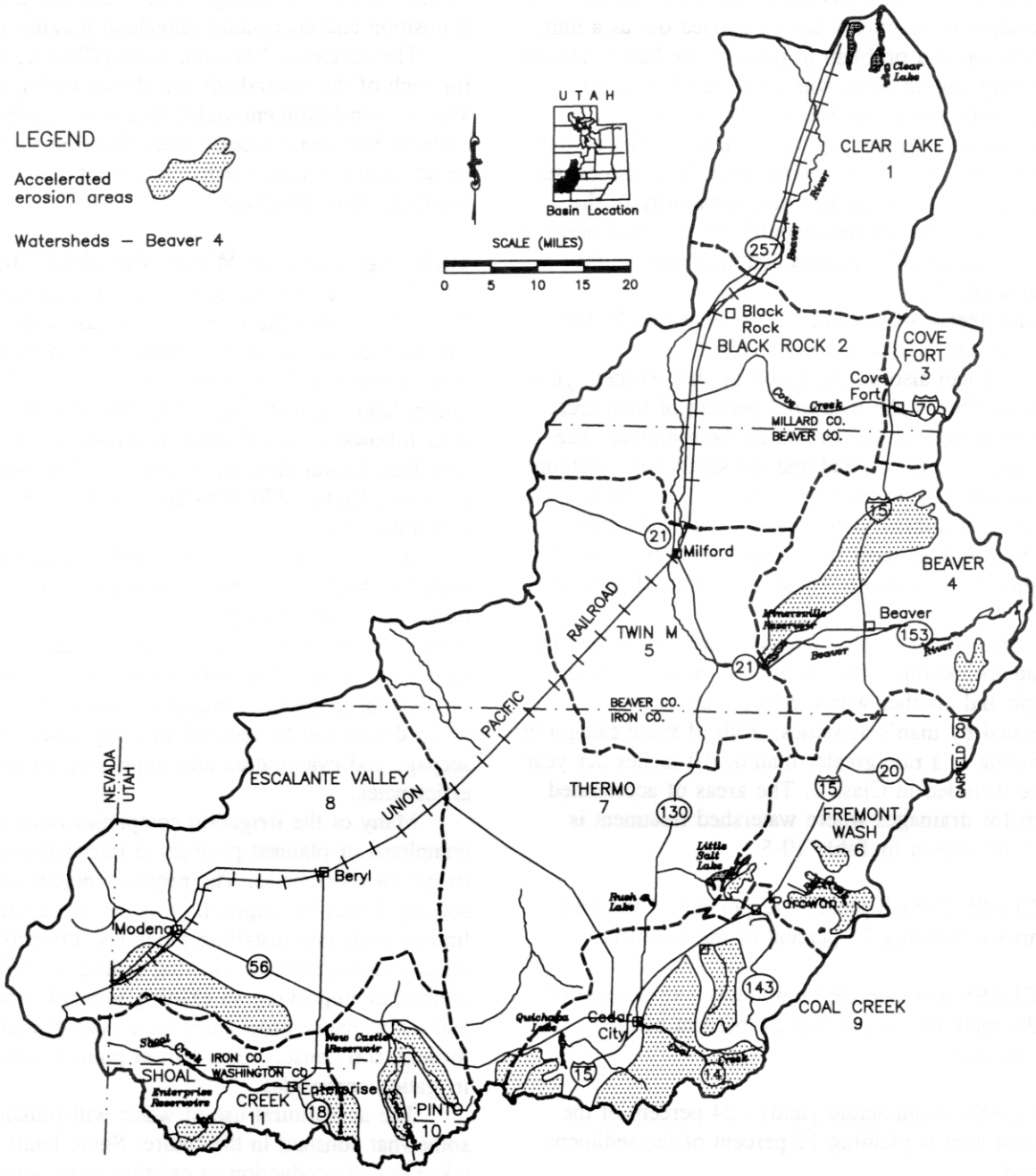
Irrigation of crops on presently irrigated lands depletes 188,510 acre-feet of water annually. Water budget and other background information shows there is an agricultural water deficit in the Parowan and Escalante valleys. The deficit amounts to only 4 percent of the total irrigated cropland consumptive use. The water deficit can be reduced in many cases by reducing seepage and evaporation and improving irrigation efficiencies.

Many of the irrigation companies have already completed or planned projects to improve overall irrigation efficiencies. The projects include reducing seepage losses by improving system management, lining canals and installing pipelines. Projects to reduce onfarm losses include selecting a different irrigation method or improving an existing method. Operation and maintenance procedures have been recommended through soil conservation district plans to some of the irrigation companies.

The agricultural use of water will remain somewhat constant in the future. Some lands will be taken out of production as existing water supplies are transferred to other uses. In some areas, new replacement lands may be developed if some of the existing water is available for agricultural uses. Current and projected areas, diversions and depletions for irrigated cropland are shown in Table 10-6.

In some areas, particularly where rangeland is used for grazing, water quality may be impacted where

Figure 10-1
ACCELERATED EROSION AREAS
Cedar/Beaver Basin



SOURCE: USDA WATER AND RELATED LAND RESOURCES SUMMARY REPORT, BEAVER RIVER BASIN.

Table 10-5
ACCELERATED EROSION

Drainage	Accelerated Erosion (Acres)
Indian Creek	4,400
Wildcat Creek	30,400
Beaver River	2,800
South Creek	400
Little Creek	6,400
Red Creek	4,300
Parowan Creek	,900
Summit Creek	10,900
Braffits Creek	6,600
Fiddlers Creek	6,700
Coal Creek	30,900
Shurtz Creek	14,800
Quichapa Creek	4,500
Pinto Creek	4,400
Little Pinto	5,000
Meadow Creek	3,900
Shoal Creek	13,100
TOTAL	154,400

livestock and wildlife concentrate for watering. There is a need to improve and provide watering facilities to better distribute livestock and wildlife.

10.7 Agricultural Water Conservation and Development Alternatives

One way of reducing the groundwater contamination and realizing additional monetary benefits from the existing water supply is to improve water use efficiency. Water use efficiency can be evaluated in two parts: off-farm conveyance and on-farm application. Delivery systems can be upgraded by lining high seepage areas in canals with concrete or installing pipelines. Installing or upgrading diversion structures and effective measurement and management controls can also increase efficient use of water. Construction of additional reservoir storage, if it can be done as part of a project for other purposes to make it affordable, can also help make better use of the existing water supplies (See Section 9.6.2, Surface Water Storage Facilities).

Irrigation practices on individual farms have more potential to improve water use and management than any other activity. Conveyance system improvements to reduce seepage can help maintain groundwater quality.

There are many incentives to improve efficiencies and conserve water. Where there is a shortage of irrigation water, increased efficiencies can make water go further and increase the number of acres with a full supply. Increasing irrigation efficiencies can also reduce the cost of irrigation. By applying less water to irrigate crops, there will be less deep percolation into the groundwater reservoir. This will reduce leaching of salts and help maintain a good quality groundwater. Financial incentives are available through several state and federal programs. See Section 8 for more information on funding. ■ ■

Table 10-6
CURRENT AND PROJECTED IRRIGATED CROPLAND WATER USE[22]

Year	Area (Acres)	Diversions (Acre-feet)	Depletions (Acre-feet)
1990	110,810	318,790	178,740
2000	110,810[a]	312,410[b]	178,740[c]
2020	110,810[a]	299,910[b]	178,740[c]

[a] Assumes no net change in total irrigated lands.
[b] Reflects an increase in overall irrigation efficiency of 0.2 percent per year.
[c] Assumes no cropping pattern change and that idle and fallow land acreages remain constant.